Identification of Fungi in Marine Algae Kappaphycus alvarezii by Different Maintenance Age

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Abstract

This study aims to determine the type of fungus and calculate the range of fungal colonies on sea algae Kappaphycus alvarezii by maintenance at different ages of 25 days, 35 days and 45 days. Samples taken from the District Anggrek, North Gorontalo District, Province Gorontalo. Method of data processing is descriptive and presentation of data in a frequency distribution table. Methods of testing done by the identification of marine algae samples in the laboratory of Fish Quarantine Station Class I Djalaluddin Gorontalo. The results showed that the fungus identified in the Sea Algae Kappaphycus alvarezii, are Rizhopus sp, Aureobasidium pullulans, Mucor sp and Fusarium sp. The range of fungal colonies on Sea Algae Kappaphycus alvarezii at the age of 25 days by the dilution factor, namely the 4000 colony 10-3, 10-4 and 10-5 of 80,000 colonies are 100,000 colonies, then at the age of 35 days with a 10-3 dilution factor of 1000 colonies , 10-4 ie 40,000 colonies and at the age of 45 days by the dilution factor yaitu7000 colony 10-3, 10-4 and 10-5 of 10,000 colonies are 500,000 colonies.

Keywords: Sea Algae, Kappaphycus alvarezii, Fungi, tending age, colony.

Introduction

Cultivation of marine algae can not be separated from the principles of engineering and economics, both for the continuity of farming as well as to improve living standards, success in cultivation of marine algae is the availability of marine algae that has quality and good quality.

One type of marine algae are cultivated in the district of North Gorontalo District Anggrek is Kappaphycus alvarezzi. This type of economic value is important because as a producer of carrageenan. In general, the content and the chemical composition of the seaweed is affected by the type of seaweed, phase (growth rate), and the age of the harvest. To obtain good quality carrageenan, harvesting of marine algae Kappaphycus alvarezzi is more than 45 days, but the seaweed used as seeds were harvested at the age of the plant ranges from 25 to 35 days (Prabowo, et al, 2008).

Problems often encountered in the cultivation of marine algae one of which is a fungus, most of the farmers lack sufficient knowledge about the presence of the fungus that attacks the algae during maintenance. Damage to the marine algae is cultivated caused by physical damage, mechanical, chemical and microbiological. Damage is microbiologically a form of damage that is very detrimental to the fishery products and can cause diseases to human health, one reason is the microorganism fungus because the fungus growth can produce toxic chemicals called mycotoxins (Hall, 1970).

Mushrooms can synthesize a protein by taking carbon source of carbohydrate (eg, glucose, sucrose and maltose), a nitrogen source of inorganic or organic material and minerals from the substrate. The fungus grows forming colonies of filamentous mold, smooth, convex and compact colony of green-gray, green, brown, black and white. Color colonies affected by the color green colored spore spore, for example, the original green colonies no longer visible white (Heroine, F, 1992).

Research Methodology

The tools used in this research is cool books, plastic bags, DO meter, pH meter, thermometer, refractometer, a petridish, auto clave, pastle, micro wave, an analytical balance, magret, aluminium foil, stomacher, a microscope, a knife, pinset , laetophenol,

copper glass, glass object, label, hot plate, camera, writing equipment.

Marine algae used as a test sample that is kind Kapaphycus alvarezii taken and collected from the beach District of Anggrek. Sampling was done by taking directly on the cultivation of marine algae and as for how sampling was conducted at different locations. Samples were taken each sample by age of planting or maintenance of different marine algae is aged 25 days, 35 days and 45 days. After the samples were obtained are then put into a plastic bag filled with sea water in order to maintain its freshness during transport.

After arriving at the laboratory samples must first be cleaned of dirt attached, the sample is washed with fresh water or tap water, to clean the salts attached, samples were then rinsed with distilled water to remove dirt and salt that are still attached, rinsing with distilled aims so that the sample truly free of all sludge / material, salts that are still ending up with fresh water / tap water and microorganisms. After that stems marine algae disordered patogis or will grow fungus, then weighed each sample of 10 grams and media to make fine substrate. Make Soborout dextrose agar (SDA) 13 grams of added distilled water to dissolve Soborout dextrose agar (SDA) , and then put into an autoclave for 30 minutes to be sterilized. Soborout dextrose agar (SDA) is mixed with refined amoxilin who aim to kill other bacteria that only fungi grow. Make Butterfiel phosphate solution (BFP) 10 mL stock solution was added 990 ml of distilled water included in the autoclave for 30 minutes to be sterilized, after it is poured into a plastic bag filled with sea algae that has been refined, then shaken using stomacher and inserted into the cup containing the media Soborout dextrose agar (SDA) and the culture medium are incubated for 5 days with temperatures 280C.Setelah incubated for 5 days fungus grown in the respective numbered cup, then picked mushrooms by using a knife and pinset, then put the mushrooms in the object laetoglass and treated with a solution of phenol and closed flat with a suitcase glass, subsequent put under microscope. Observation targets under the microscope and matched mushrooms with identification book, so it can be obtained the data that was identified as the fungi.

Data obtained in this research is descriptive quantitative processing and presentation of data in a frequency distribution table. Methods of testing conducted exploratory is a research method that is carried out to reveal information of a particular fact of the presence of mold and mildew colonies on sea algae Kapapphycus alvarezii age different maintenance, testing is done on fish quarantine laboratory grade 1 Gorontalo. According to Fardiaz (1992) how to calculate number of colony on seaweed.

Results and Discussion

Fungus Identification

The identification results in a petri dish can be seen media appearances such as cotton or thread mushroom-white thread allegedly types of Fusarium sp. It is also in accordance with the opinion of Pisalemo (2011) that the fungus white as cotton is a Fusarium sp. The apparition of these fungi also guess is kind of Mucor sp. (Fardiaz, 1992). Visible mold growth is also colored black like cotton that is suspected of Rhizopus sp. It is appropriate Marhamah opinion (2005). It also alleged sightings type is the kind of Aureobasidium pullilans. Sightings fungus can be seen in Figures 1 and Figure 2.

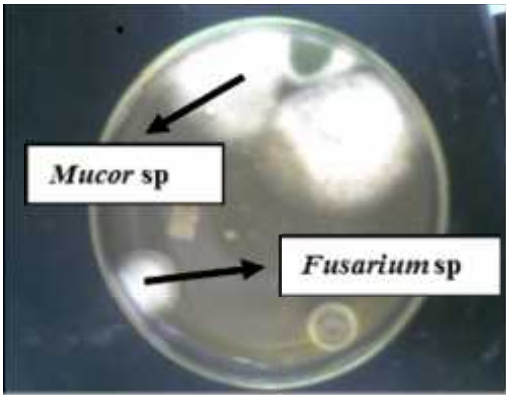

Figure 1 Mucor sp and Fusarium sp

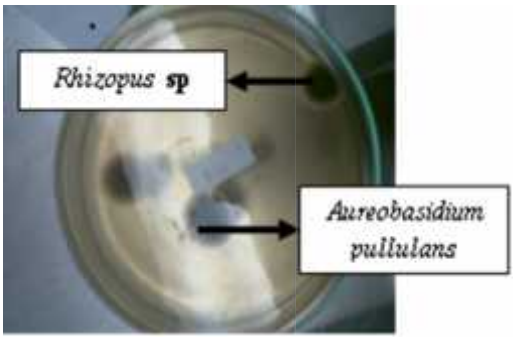

Figure 2 Rhizopus sp and A. Pullulans

Result of fungal identification on Kappaphycus alvarezii were Rhizopus sp, Aureobasidium pullulans, Mucor sp, and Fusarium sp

1. Rizhopus sp

Figure3 Rhizopus sp.

Rhizopus sp live as a saprophyte and can generate spores. Rhizopus sp. usually grow very fast from all miseliumnya shaped like cotton into a blackish result of the growth of sporangioforanya dark. Rhizopus sp.Can harm humans by causing zygomiosis fatal for life. Forms Rhizopus sp. (Marhamah, 2005). This fungus is a fungus that is very useful for making tempe, but this type of fungus can disrupt and destroy the plant one of the plants of marine algae. This fungus attacks the algae are characterized by white spots on the thallus, slow growth, discoloration thallus becomes pale or bright colors, and some or all thallus in several branches decay (Noviar, 2001).

2. Aureobasidium pullulans

Figure 4 Aureobasidium pullulans

AUreobasidium pullulans is one mushroom that is non-pathogenic and non-toxic. This fungus commonly found in soil, water lakes and vegetation (leaves and wood). AUreobasidium pullulans is a polymorphic fungus life cycle consists of a complex morphological changes (Seviour, et al., 1992). This fungus as food for plants fastener marine algae, where the fungus is living interdependence with plants in tumpanginya, this fungus can provide food reserves so that both of these organisms do not hurt each other but mutually beneficial between people (Lee, 1996).

3. Fusarium sp

Figure 5 Fusarium sp.

According Fardiaz (1992), Fusarium sp. grow on foodstuffs and difficult to identify because of the appearance of growth varies and is one of the genera that produce mycotoxins. According Hariyanto (1990), the fungus Fusarium sp. Which is borne pathogens, including parasites, fungi, algae thallus is transmitted through the sea and infect plants through wounds on thallus. This fungus is one of the fungi that can be detrimental to the plant, especially in marine algae plants. Marine algae infected with this fungus can be seen by a color change on the part of thallus that can cause wounds on the thallus thallus algae and cause rot and disconnected (Santoso, 1994).

4. Mucor sp

Figure 6 Mucor sp.

Role Mucor sp. can cause infection sudden, severe and rapid in tissues. Mucor also called mushroom dimorphic due to change of the form of filaments into a shape such as yeasts, mushrooms are one of the fungi that can benefit plants because

this fungus absorbs nutrients to plants in host by way of mutuality means that these fungi living in symbiosis with the organism in host so that both are mutually beneficial (Marhamah, 2005).

The total range of fungal colonies on Kappaphycus alvarezii

The result of the calculation of total fungal colony on marine algae Kappaphycus alvarezii, bsed on sample data for 25 days with a dilution factor of 10-3, 10-4 and 10-5 obtained results of calculation of the total fungal colonies ranged from 4 x 103-1 x 104. Samples 35 days dilution 10-3 and 10-4 obtained calculation results show the value of total fungal colonies ranging from 1 x 103-4 x 104. Samples were 45 days with dilution of 10-3, 10-4 and 10-5 obtained total fungal colonies on calculations based on data shows that the value of mushrooms ranged between 7 x 103-5 x 105. the total range of fungal colonies on sea algae Kappaphycus alvarezii can be seen in Table 1.

Table 1 Total colony of fungi on the sea alga Kappaphycus alvarezii

sample	colony of fungi at each solution			
	10^2	10^3	10^4	10^5
25 hari	0	4 x 10^3	8 x 10^4	1 x10^5
total	0	4000	80.000	100.000
35 hari	0	1 x10^3	4 x 10^4	0
total	0	1000	40.000	0
45 hari	0	7 x 10^3	1 x 10^4	5 x 10^5
total	0	7000	10.000	500.000

Source: data analysis (2015)

Based on the above table can be seen at different ages maintenance of marine algae Kapphapycus alvarezii there is a difference in the number of fungal identification. This happens because of their age difference factor of maintenance on the marine algae. In addition, weather conditions that frequently change can affect the growth of fungus.

According Suhaini (2009) that the changes that occur in the water environment can lead to changes in morphology and physiology, fungus requires appropriate environmental conditions for growth, factors affecting the growth of fungi such as abiotic factors namely the temperature, pH, moisture and oxygen needs.

Furthermore, a fungus that grows on marine algae Kappaphycus alvarezii influenced the temperature circumstances are always changing. The temperature range of research sites reached 27,5oc-28,5oc, because the fungus can grow in the temperature range. This is in accordance with the opinion of Sandy (2013) that the fungus can grow in the temperature range of 25oC-30oC. In addition, the pH at study sites in the range of 7.4 to 7.5 pH range can trigger fungal growth on marine algae Kappaphycus alvarezii, according Suhaini (2009) fungi can grow well in a pH range of 2-8.

Factors that trigger the growth of mold growth at this location because the majority thallus on marine algae Kappaphycus alvarezii there are mud which can grow fungus and inhibit the growth of marine algae for photosynthesis process is hampered by the mud particles. This is consistent with the statement Anggadiredja et al (2004) that the brightness is good for the growth of marine algae ranging from 2-5 meters. Turbidity in the water can inhibit the penetration of sunlight into the waters, so that the process of photosynthesis to be disturbed. Additionally turbidity in the water caused by the particles of mud bottom by currents and attached to the thallus that cover the thallus algae and blocking sunlight through thallus causing algae to become weak and susceptible to disease one fungus. According to Darmono (2000) mud can have an impact on aquatic ecosystems that would endanger public health and maritime industries such as aquaculture.

Water quality parameters

One of the aspects that influence success in the cultivation of marine algae is water quality. Results of measurements of water quality at the site in Table 2.

Table 2 Water quality parameters

Parameters	Water qualities		
	Ages (days)		
	25	35	45
Temp. (^oC)	28	28,5	27,5
DO (mg/l)	5,6	5,2	5,2
pH	7,4	7,5	7,4
Salinity (ppm)	31	30	30
Brightness (cm)	145	175	150
Current(cm/sec)	29	32,5	34

According to the table above can be seen six water quality measurements from both locations during the study of temperature, pH, DO, salinity, brightness and speed of flow. According Sulistijo and Atmadja (1996) that the water temperature range which is good for marine alga K. alvarezii is 27-30 oC.Yag pH aquaculture K. alvarezii ranged from 7 to 8.5 in accordance with the statement aslan (1998). According to the Ministry of Agriculture (1998), dissolved oxygen (DO) is good for marine algae ranging from 5-7 mg / l. Salinity range is good according Armitata, (2011) for the cultivation of marine algae is 30-37 ppt. According to Anggadiredja et al (2006) for the cultivation of marine algae brightness range of 2-5 meters, and the velocity is good according to Mubarak (1982) ranges from 20-40 cm / sec.

Conclusion and Suggestion

The mushrooms were identified in marine algae K. alvarezii are the fungus Rizhopus sp, Aureobasidium pullulans, Mucor sp and Fusarium sp.

Fungal colonies on sea algae aged 25 days showed the value of mushrooms ranged 4000-100.000 colonies. Age 35 days ranged between 1000-40.000 colonies, and ages ranged from 45 days 7000-500.000 colonies.

Further research on the identification of species of fungi are recommended that will be beneficial to the well documentation of marine algae.

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